1:Gurdon E-4, 5 (no date) 1907 AR7 Khasi AR7

157 in the Jowai sub-division. In the vicinity of Nongpoh is observed the beautiful *sakor* or *sapoovar*, the iron-wood tree. The latter is also to be found on the southern slopes of the hills in the Jowai sub-division. There are some *sal* forests to the west and south of Nongpoh, where the *sal* trees are almost as large as those to be found in the Garo Hills. Between Shilling and Jowai there are forests of oak, the country being beautifully wooded. Chestnuts and birches are also fairly common. The low hills on the northern and western sides of the district are clad with dense forests of bamboos, of which there are many varieties. The *Pandanus* or screw-pine is to 136 be met with on the southern slopes. Regarding the geological 133 formation of the hills, I extract a few general remarks from the Physical and Political Geography of Assam. The Shilling plateau consists of a great mass of gneiss, here on the northern border, where it is broken into hills, for the most part low and very irregular in outline, with numerous outliers in the Lower Assam Valley, even close up to the Himalayas. In the central region the gneiss is covered by transition or sub-metamorphic rocks, consisting of a strong band of quartzites overlying a mass of earthy schists. In the very centre of the range, where the table-land attains its highest elevation, great masses of intrusive diorite and granite occur; and the latter is found in dykes piercing the gneiss and sub-metamorphic series throughout the southern half of the boundary of the plain. To the south, in contact with the gneiss and sub-metamorphics is a great volcanic outburst of trap, which is stratified, and is brought to the surface with the general rise of elevation along the face of the hills between Shella and Therieghat south of [illegible] trap. South of the main axis of this metamorphic and volcanic mass are to be found Strata of two well defined series: (1) the cretaceous, and (2) nummulitic. The cretaceous contains several important coalfields. The nummulitic series, which overlies the cretaceous, attains a thickness of 900 feet in the Theria river, consisting of alternating strata of compact limestone and sandstone. It is at the exposure of these rocks on their downward dip to the edge of the plateau that are situated the extensive limestone quarries of the Khasi Hills. There are numerous

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limestone caves and underground water-courses on the southern face of the hills. This series contains coal-beds, e.g. the Cherrafield and that at Lakadong in the Jaintia Hills. Some description of the remarkable Kyllang Rock may not be out of place. Sir Joseph Hooker describes it as a dome of red granite, 5,400 feet above sea level, accessible from the north and east, but almost perpendicular to the southward where the slope is 80° for 600 feet. The elevation is said by Hooker to be 400 feet above the mean level of the surrounding ridges and 700 feet above the bottom of the valleys. The south or steepest side is encumbered with enormous detached blocks, while the north is clothed with forests containing red tree-rhododendrons and oaks. Hooker says that on its skirts grows a "white bushy rhododendron" which he found nowhere else. There is, however, a specimen of it now in the Shillong Lake garden. Numerous orchids are to be found in the Kyllang wood, notably a beautiful white one, called by the Khasis *u'tier kyllang synrai*, which blooms in the autumn. The view from the top of the rock is very extensive, especially towards the north, where a magnificent panorama of the Himalayas is obtained in the autumn. The most remarkable phenomenon of any kind in the country is undoubtedly the enormous quantity of rain which falls at Cherrapunji.* Practically the whole of the rainfall occurs in the rains, i.e. from May to October. The remainder of the district is less rainy. The climate of the central plateau of the Shillong range is very salubrious, but the low hills in parts of the district are malarious. The effect of the different climates can at once be seen by examining the physique of the inhabitants. The Khasis who live in the high central plateaux are exceptionally healthy and strong, but those who live in the unhealthy "Bhoi country" to the north, and in the Lyngngam section on the west of the district, are often stunted and sickly. Not so, however, the Wars who live on the southern slopes, for although their country is very hot at certain times of the year, it does not appear to be abnormally unhealthy except in certain

* The average rainfall at the Cherrapunji Police Station during the last twenty years, from figures obtained from the office of the Director of Land Records and Agriculture, has been 426 inches. The greatest rainfall registered in any one year during the period was in 1896, when it amounted to 641 inches.

10: Clarke U-3 (no date)1874 AR7 Khasi AR7

In these hills a dozen monuments on the binary type may soon be found in which there are two equal upright slabs in the middle, and the other stones placed symmetrically on each side of them.

7. There are three kinds of rock employed by the Khasis for stone monuments, viz.:—

a. The Cherra sandstones.
b. The Shillong sandstones.
c. The granite.

Small stones are conveyed considerable distances from the place of manufacture before they are set up—large stones are not—hence the material of the monuments is determined everywhere geologically.

a. The Cherra sandstones are tertiary and cretaceous rocks spread along the southern edge of the plateau and producing the ledges which mark its abrupt termination. In the great thickness of these sandstones are many beds in which the rock occurs in large sheets with very few joints, and well-adapted for working out large slabs therefrom. The sandstone is generally very hard, but not so hard but that the Khasis can work it with their own native-made iron tools.

There is a quarry, now in full work, about half-a-mile out of the old Cherra cantonment, upon the Mamloo path, where slabs may be seen in preparation. The slabs made from the Cherra sandstones, admitting of being worked, are generally hewn pretty fairly to a shape and smoothed before being set up. The ancient monuments are, however, often made of very rough slabs.

All the well-known monuments near the old Cherra station are made of these sandstones, as also the large monuments at Mamloo, Mawmai, and Lisiuow. These three monuments all stand on sheets of Cherra sandstone and the stones were cut out of the rock hard by where they now stand. The stones quarried now outside the Cherra cantonment, being for transport, are none of great size.

The Khasis also work gigantic slabs of stone for bridges. Where the span is anything under twenty feet a single slab [illegible] of enormous blocks of sandstone are raised on each side, on which the slab may rest, if there is the remotest fear that the water can, in any flood, reach the under surface of the slab. As compared with such a bridge the Khasis regard the best efforts of the English engineers as mere makeshifts. The arch at Amwee figured by Dr. Hooker is Bengali work.

b. The Shillong sandstones extend over a large area of the northern portion of the plateau: they are often more argillaceous

10:Clarke U-3 (no date)1874 AR7 Khasi AR7

135 (sometimes slaty) than the Cherra sandstones, and are geologically ancient, probably being of palæozoic age, but containing no fossils. They are generally inclined at high angles and the beds are full of joints, and do not admit of large slabs being got out of them. I know of no monument of the first class made out of Shillong rocks, but slabs of six feet high are very common. They are generally obtained by splitting out with wooden wedges and are not often finished with iron tools. The monuments on the Shillong sandstone area are therefore of a much rougher character than the Cherra monuments, the stones irregular in shape, and the stones that should correspond in size only corresponding very roughly. It is often very difficult to say whether these monuments are of the regular 3-5-7 stoned type or not, but they all are designed in general accord with the two great types of upright and horizontal slabs.

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135 *c.* A large area, perhaps 1,000 square miles, of the Shillong plateau, is covered with scattered blocks of granite, varying in size up to masses as large as cottages: perhaps the Kollong rock itself (figured by Hooker) might be counted as the extreme size

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135 such blocks here reach. This granite area runs east and west through the centre (or somewhat through the northern half) of the plateau. It is of great width and continuity westward, becomes broken into isolated areas in the centre of the hills, and becomes very narrow in the Jáintea territory, finally dying out

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in East Jaintea, according to the Khasis, who are good geologists. 135

These granite blocks are found on the steep hill sides and on the hill tops, the valleys between being often entirely destitute of them. The highest hills of the plateau are especially favoured with them as Nonglas (Nunklow) and Laitlankote. On the edges of the granite area and on the isolated peaks of the country, outlying heaps of granite blocks are found. Around Jowye (the Jaintea capital), the country is very uniformly at a level of about 4000–4500 feet above the sea, and not a granite block is to be seen there, nor in marching east thence, where you keep at the same level, until you reach the Ralliang hill about twelve miles east of Jowye, where the blocks appear again in full force all over the summit of the hill.

From these granite blocks, slabs of almost any size might be obtained, but the Khasi native iron tools will not work this granite, which is very hard, and the granite slabs used in the Khasi monuments are merely flakes obtained by heating the block with fire along a line and then pouring cold water upon it. The upright granite slabs thus frequently exhibit one convex and one concave face, as also do the horizontal slabs which are round or oval, not quadrangular. The flakes are entirely unworked in the Khasi territory, so that the granite monuments have an extreme rudeness and ruggedness about them which has been commonly supposed to indicate extreme antiquity. This I believe is altogether a mistake, but at the present time the taste of the people appears educated up to a preference for worked stones, and I have not seen any granite monument in process of construction, though I am told that many have been made within the memory of man. 316

There is an important difference in the Jaintea granitic monuments which are neatly worked to the approved form. The Bengali Rajahs of the plains, Jaintea and Jaintenpore, have long established an influence in the hills, and Bengali workmen have thus penetrated the hills from Jaintenpore by Amwee up to Jowye, the hill capital, and further. The Bengali tools are able to cut both hard granite and soft sandstone, and dressed stones for monuments or for bridges, are commonly found neatly hewn, all the way from Jaintenpore up to Nartiung, north of Jowye.

Large granite stones are rather more difficult to move than sandstones of the same dimensions, and the first class granite monuments are found on the spot where the granite blocks abound. Where an isolated hill was covered with large blocks, and no blocks were seen anywhere else near, this seems at once to have suggested such a hill as a suitable spot for monumental erections. In just the same way at Stonehenge the large stones

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CHAPTER II

General features of the district

128 2.1 In this chapter a brief note on the geography, population and economy of the district is given in order to provide a perspective and make the report self contained.

133 **2.Relief.**—The whole of the district is composed of hill tracts. On the northern and western border these hills take the form of tumble-ranges which run for the most part north and south and have a general height of two to three thousand feet. None of the hills in the central and southern portions of the district has anything rocky or precipitous about them. Their sides are covered with short grasses and from one direction or another, they can generally be negotiated by a man on horseback. There is a high plateau in the centre of the district, the general level of which is not much below 6000 ft though it decreases in height towards east and west.

2.Rivers.—The high plateau that traverses the centre of the district the watershed of the hills. The following are the principal rivers. In the west there is the Jadukata or Kynshi river, further east are the Um Maotta and the Bogapani which fall into the Surma. The Ungot or Maheshkhali, known as the Piyian Gang in the plains of Sylhet forms for a considerable distance the boundary of the Khasi and Jaitia Hills. On the north the principal rivers are Kaithri, the Digaru and Umiam. Further west comes the Umkhen, Um Mistang and the Mahyariang. All these rivers possess the characteristics usually associated with hill streams. The beds are rocky and gravelly, the current swift and after heavy rains even small streams come down in spate. The rivers of the district are not used for traffic to any appreciable extent.

135 **2.4 Minerals.**—The Geological products of economic value are lime and coal. From the earliest days of British rule, the lime quarries of Khasi Hills formed one of the principal attractions of Sylhet, drawing large number of Europeans to that district. The lime quarries are situated all along the southern face of the hills. Coal is found both in the cretaceous and nummulitic formations. The largest deposits of nummulitic coal are found at Cherrapunjee, Lairyngew, Mawlon Mawsh, Mawsynram, Mowdon, Thanjirath, Lakadong and Narar. Cretaceous coal is found in Mootchhakur, Berooa, Wapung Lairkynsew and in the Langrin field.

137 **2.5 Forests.**—The district exhibits a varied flora reflecting the variations in the physical features, configuration of the ground, edaphic factors and climatic gradient. In the pine zone, covering areas between 2500'- 6200' elevation are found the pines, birch, schima, oak, beech, etc. The evergreen hardwood zone, which forms belt along the foothills contains useful hardwood species of which the most important species are sal, nahor, chom, chap, gamari, etc. The dry grass belt covering the lower slopes roughly between 500'-2500' elevation form the best ground for grasses.

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homicide), in which their own subjects are concerned. All cases of homicide, or matters involving disputes between people belonging to different States, are adjudicated upon by the British officers of the District.

In the British possessions, the principal sources of revenue are rents and royalties derived from mineral workings, such as lime and coal; rents of fisheries; and a house tax, which varies, according to situation and productiveness of the soil, from R. 1 to Rs. 2 or from 2s. to 4s. per house. A land tax is only levied in tracts where the Government possesses the actual proprietary right in the soil. Again, in the Khási States, the British Government, which undertakes the management of the natural products of the country, such as waste lands, coal, lime, etc., receives a half-share of the rents realized from these sources, the other half belonging to the native Chiefs. The other sources of revenue of the Chiefs are market dues, cesses levied occasionally for State purposes, and fines realized in the administration of justice.

History.—Our first knowledge of the Khási Hills dates from the time when the East India Company acquired the *diwání* of Bengal in 1765. The adjoining District of Sylhet was included in that grant; but as the hillmen had never acknowledged any subjection to the Muhammadans, so they still remained absolutely independent of the British power. However, the necessities of commerce, arising from their monopoly of the lime quarries, from which Bengal has drawn its supply from time immemorial, soon attracted European enterprise to the country. As stated in the Appendix to the Statistical Account of Sylhet, the control of the profits of the lime trade formed in early times one of the most valuable advantages attaching to the position of the official in charge of that District. It does not appear that any European had been attracted to reside in the Hills before 1826. In that year the Rájá of Nongkhlao entered into an agreement with certain European British subjects to allow a road to be made across the Hills, to connect the Surmá valley with Assam Proper. These Europeans took up their residence at Nongkhlao. Misunderstandings unfortunately arose, and, partly by the misconduct of some of their Bengálí followers, the growing discontent and apprehension were fanned into a flame. On 4th April 1829 the Khásis rose in arms and massacred Lieutenants Bedingfield and Burlton, together with some sepoys. This led to military operations on the part of the British Government, which

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175 Khásás, have, ever since the measures of improvement which
648 followed, remained peaceable and contented.

General Aspect of the District.—The District consists
133 almost entirely of hills, only a very small portion lying in the plains. The slope of the hills on the southern side is steep, until a table-land is met with at an elevation of about 4000 feet. Higher up there is another plateau at Máo-flang, ten miles to the eastward of which, and in the same mountain range, the Civil Station of Shillong is situated at an elevation of 4900 feet above sea level. On the northern side of the hills are two plateaux, one between 1000 and 2000 feet below the level of Shillong, and the second lower down, about 3000 feet above sea level. In general features all these plateaux are much alike, and consist of a succession of undulating downs, broken
137 here and there by the valleys of the larger hill streams. In the higher ranges, where the hills have been denuded of forest, the country is covered with short grass, which becomes longer and
[778] more rank in the lower elevations. A remarkable feature in the aspect of the country throughout the hills is the numerous sacred groves which superstition has preserved from time immemorial from the destructive hand of the woodcutter. These sacred groves contain beautiful timber-trees of various kinds, rare orchids, rhododendrons, and wild cinnamon. On the more elevated table-lands, pine trees and stunted oak are met with; and in the lower hills, in every direction, are dense forests of the usual Indian trees, containing valuable timber.

134 The geological formation is mainly granitic, with stratified rocks
135 of sandstone, limestone, and shale. The coal-beds rest on trap and metamorphic rocks. The prevailing surface soil is a red ferruginous loam.

133 Mountains.—The principal mountain ranges and highest peaks in the Khási and Jáintiá Hills are as follow:—(1) The Shillong range—height of principal peak, 6449 feet above sea level. (2) Dongáei range—principal peak, 6400 feet. (3) Máo-thad-sti-shán range—highest peak, 6237 feet. (4) Lúo-syn-nid range—highest peak, 5775 feet. (5) Lúit-máo-dish range—highest peak, 5377 feet. (6) Lúo-ber-sit—highest peak, 5400 feet. (7) Lúo-lah range—highest peak, 4264 feet. (8) Lyng-ker-dem range—highest peak, 5000 feet. (9) Lúm-luiong range—highest peak, 4646 feet. (10) Máo-syn-rám range—highest peak, 5810 feet.

The principal mountains are:—(1) Rap-lang—height, 3671 feet.

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133 they form rapids, the waters precipitating themselves down deep, rocky gorges and chasms, choked with huge boulders. Some of these gorges are very beautiful; the streams, being hemmed in between stupendous mountains and rocks covered with primeval forest, run in narrow but very deep channels swarming with fish. No islands or lakes are formed by any of the rivers, although several of them have large, deep pools. They are all unfordable during the rains.

312 Utilization of the Water Supply.—None of the rivers are utilized as a motive power for turning machinery, although the streams on the higher plateaux might be easily turned to such an account. Their waters, however, are extensively used for the purposes of irrigation, and the hill people display great ingenuity in cutting channels or aqueducts for leading the water on to their [365] fields. It is in this manner that the Civil Station of Shillong receives its water supply. Aqueducts convey water to the houses of all the European residents; and branch channels from the main aqueduct flow through the *bázár*, and along the streets occupied [226] by the native inhabitants. No fishing towns exist in the hills; but [563] near where the rivers debouch upon the plain are some valuable fisheries, which are annually let in farm, the lessees being generally Bengális. These fisheries yield an annual Government revenue of about £300. Embankments in order to protect the land against floods do not exist. A few embankments, or rather dams, are thrown across narrow valleys between hills, so as to create reservoirs for water. At Shillong there are a few tanks thus formed, which are both useful and ornamental.

135 Minerals, etc.—Coal and limestone, both of excellent quality, are found in abundance. Lower Bengal obtains nearly the whole of its lime supply from the Khási and Jaintia Hills. The lime is known as 'Sylhet lime,' and is obtained by quarrying from the beds of stone which line the base of the mountains along the whole length of the Sylhet boundary. The supply is literally inexhaustible. Coal out-crops at Cherrá Pínji, Lákádong, Shellá, Máo-syn-ram, and at several other places; but as a rule it is scattered, and found in places difficult of access. The coal, however, is of excellent quality, and leaves very little ash. Stone, well adapted for building purposes, is also found. Ironstone exists almost everywhere throughout the Hills, but principally in the dependent States of Khyrim, Nongpoh, Cherrá, and Mylliem. In former years the Khásás were

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491 Pínji, and Tharíghát, to Bholágánj in Sylhet; length, about 130 miles. Repairs to this road are effected partly by the inhabitants of the Native States, and partly by Government. (3) Cart road from Shillong to Mío-thing, 14 miles. This road has been opened for cart traffic throughout. (4) Road from Shillong, *viâ* Jowái and Mukhtápur, to Jáintápur in Sylhet; length, about 70 miles. This road is being improved from year to year, and when finished the cost may amount to £50 per mile. (5) Road to connect Shillong with the Gáro Hills, opened out from Márbisú, *viâ* Sob-iong, Kynchi, Mío-ker-chá, and Nongstoin, to within 10 miles of the boundary between the two Districts; length, about 52 miles. This road is at present only a fair-weather road. It was made in 1872-73, and when completed may cost £50 a mile. (6) Road to connect Shillong with the Confederate State of Sheilá, bordering on Sylhet, from Lyn-kyn-tyng-noh *viâ* Pum-stan-ngát to Sym-pher; length, about 26 miles. This road, when completed, will be about 60 miles in length. (7) Road leading *viâ* Lait-tyng-kot to Sob-rá-rim and Cherrá Púnjí; length, about 22 miles. This is at present a bridle path, but may eventually be the line for a cart road to Cherrá Púnjí. (8) Road from Jowái, in the Jáintiá Hills, to Nong-ri-tiong; length, about 12 miles. This road, when extended, will connect Jowái with the District of Nowgong in the Brahmaputra valley, and the estimated total length will be about 90 miles. Besides the above-mentioned eight roads, there are other bridle paths which facilitate access to remote places.

• 135 Coal Mines.—Coal exists in the Khási and Jáintiá Hills in connection with the limestone formation. As a rule the carboniferous strata are not extensive, and they are for the most part found in localities more or less inaccessible. In the Khási Hills coal has been discovered at the eleven following places:—(1) By-ong, altitude about 1242 feet above sea level; (2) Cherrá, 4118 feet; (3) Lait-tyng-iew, 4800 feet; (4) Mío-long, 600 feet; (5) Mío-sooh, 1500 feet; (6) Mío-syn-rim, 4000 feet; (7) Mío-dun, 400 feet; (8) Mío-nai-chhorá, 300 feet; (9) Mío-beh-lyrkár, 5000 feet; (10) Sheilá, 800 feet; (11) Thinjindih, 4400 feet. In the Jáintiá Hills at the five following localities:—(1) Am-wi, altitude about 3800 feet above sea level; (2) Lá-kú-dong, 2000 feet; (3) Nár-pá, 500 feet; (4) Sub-tyng-gilh, 3500 feet; (5) Sher-mang, 4000 feet. The most extensive of the coal beds are those situated at Cherrá Púnjí in the Khási Hills, and at Lá-kú-dong in the Jáintiá Hills.

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The coal strata at the former place are calculated to extend over one-third of a square mile, with an average thickness of from 3 feet 6 inches to 4 feet; and the yield of the coal, if it could be worked, is estimated at 447,000 tons. At the latter spot the area of the coal-fields is computed to extend over 0·394 of a square mile, and the estimated yield of the mineral is about 1,100,000 tons. The coal at Cherrá Púnjí and at Lá-kà-dong is in quality equal to some English coals; it is quick in its action, and consequently would generate steam rapidly; it cakes well, but gives out a large amount of smoke; it is fragile and easily broken. From the absence of that definite structure which produces the planes of division known to English miners as 'backs,' or joints in the coal, it breaks into unsymmetrical pieces, and consequently does not stow well. From its composition, quick combustion, and irregular cleavage, it is estimated to be from 5 to 7 per cent. inferior to good English coal; but as a gas-producing coal it is considered superior to English produce, both as regards quality and purity of the gas. It is also calculated to yield a good quality of coke. The market value of coal found in the Khási and Jáintiá Hills cannot be given with any approach to accuracy, owing to the expense of labour in the Hills and of carriage to the plains. The Station of Shillong, which consumes coal as fuel, derives its supply from the coal beds at Mao-sáh-lyèh-ár, 18 miles distant, and the price is as high as £3 per ton. Lá-kà-dong is within six miles of Borghát, a village on an affluent of the Surmá, which is accessible all the year round by boats of 300 maunds, or 28 tons burden; but at present only cooly-carriage is available between Lá-kà-dong and Borghát.

The following is a brief history of the mines at Cherrá Púnjí in the Khási Hills, and at Lá-kà-dong in the Jáintiá Hills:—Government holds a perpetual lease of the Cherrá Púnjí mines from the chief or Siem of Cherrá, conditionally upon the payment by Government of a royalty of two shillings and eightpence for every five tons of coal quarried and removed from the mine, and also upon the terms that the people of Cherrá shall be permitted to work the beds on their own account. In 1844 Government transferred its right to work the mine to Captain Engledue, then agent of the Peninsular and Oriental Company, for a period of twenty years; but in the following year this gentleman, with the permission of Government, made over his lease to Messrs. Osborne & Co., of Calcutta, who worked the mine for about two years,